# AMRAD NEWSLETTER

## Amateur Radio Research and Development Corporation          Feb 83

### February 7 Meeting

Bruce Brown, WA9GVK of Metrovision fame will describe the wonders of fast-scan Amateur Television (ATV) and conduct a live demonstration. The meeting will be at the Patrick Henry Branch Libary, 101 Maple Ave E (VA Rte 123), Vienna, VA. Guests are welcome.

Bruce is one of the founders of the Metrovision ATV Club and trustee of their WR4AAG ATV repeater in Alexandria, VA.

### February 27 VWS WINTERFEST

On Sunday, February 27, the Vienna Wireless Society will hold its 10th annual ARRL-approved WINTERFEST (tm), starting at 8 A.M. at the Community Center, 120 Cherry St, Vienna, VA. Tickets are $4. The talk-in frequencies are 146.31/.91 and 146.52 MHz. For more information, send an s.a.s.e. to WINTERFEST '83, P.O. Box 418, Bienna, VA 22180 or call Jeff Wilkes, W4NFA at 703-281-4249 or on the Virginia Sideband Net.

### 1983 Calendar

Please mark these events on your calendar:

March 1 Metrovision Meeting: 7:30 at Television Station, WDVM Channel 9, Washington, DC.

March 7 AMRAD Meeting: AX.25 Tutorial by Terry Fox, WB4JFI

March 18-20 West Coast Computer Faire and ARRL Packet Conference, San Francisco, CA.

March 27 Greater Baltimore (MD) Hamboree and Computerfest at 8 A.M., Maryland State Fairgrounds (east of I-83 exit 17, 3 mi north of Baltimore's I-695).

April 4 AMRAD Meeting: Review of the ARRL San Francisco Packet Conference

April 16-17 Trenton (NJ) Computer Festival

April 29-May 1 Dayton (OH) Hamvention

May 7 Roanoke Division League Planning Meeting, Myrtle Beach, VA

May 16 AMRAD Meeting: Local Area Networks by Hal Feinstein, WB3KDU

June 6 AMRAD Meeting: 1983 Science Fair Winners by Bill Pala, WB4NFB

AMRAD Vienna meeting dates for the rest of 1983:

July 18, August 1, September 19, October 3, November 7, December 5.

### Membership Renewal

Please look at your mailing label and check whether it is time for you to renew your membership.

### Second ARRL Packet Conference

The ARRL's Second Amateur Radio Computer Networking Conference will be an all-day meeting held on Saturday, March 19, 1983 in a room set aside within the West Coast Computer Faire in San Francisco, CA. The Faire itself runs from Friday, March 18 through Sunday, March 20. So, if you are interested in participating, the best scheme is for you to plan to see the Faire on Friday so that you can be free to attend the packet gathering on Saturday. The exhibits are not quite so crowded on Friday; however, it's elbow-to-elbow exhibits on Saturday and Sunday.

Technical papers will be presented by a wide variety of speakers. Here is a partial list of conference speakers:

Den Connors, KD2S
Terry Fox, WB4JFI
Dave Henderson, KD4NL
Hank Magnuski, KA6M
Dan Morrison, KV7B
Margaret Morrison, KV7D
Harold Price, NK6K
Bob Richardson, W4UCH
Paul Rinaldo, W4RI

The program will include:

the evolution of packet radio,
AX.25 packet protocol,
several aspects of the development of the Tucson Amateur Packet Radio (TAPR) Terminal Node Controller (TNC) hardware and software,
Packet Assembler/Disassembler (PAD) and Packet Adaptive Modem (PAM) designs by the Amateur Radio Research and Development Corp. (AMRAD),
software assembly and disassembly of packets, and
the Pacific Packet Radio Society (PPRS) will conduct live packet radio demonstrations.

Participants are urged to preregister by sending a check payable to "Henry S. Magnuski" in the amount of $19 (to cover both Faire and the packet conference tickets) to: 311 Stanford Ave, Menlo Park, CA 94025.

The price includes a personal copy of the proceedings which will contain all of the packet conference papers. Tickets will be mailed to you. Late registration at the door will be possible at slightly increased price and inconvenience. Also, there will be an opportunity to purchase copies of the conference proceedings by mail after the conference for those who are unable to attend. The price and where to order the copies will be announced later.

Plans are for a luncheon at the nearby Salmagundi Resaurant on Saturday at noon.

Anyone wishing to appear on the program or have a paper included as part of the proceedings should contact Paul Rinaldo, W4RI, on 703-734-0878 (days/eves) immediately. There is a little flexibility in the previously announced February 5 deadline for camera-ready papers, but not very much and still get the proceedings printed in time for the conference.

# TRS-80* Programmer's Sourcebook

The *only* sourcebook for the serious TRS-80 user that is separated by model and contains listings for both *application* software and *system* software (with categories for assemblers/disassemblers, data management systems, debugging tools, editors, I/O services, languages, operating systems, and utilities), *plus* listings of related publications (including books, periodicals, and newsletters), *plus* a listing of TRS-80 clubs across the nation and in Canada.

The *TRS-80* Programmer's Sourcebook, a semi-annual publication issued in January and July, provides a national forum for professional and amateur TRS-80 programmers to list their *application* and *system* software offerings and provide authors and publishers an opportunity to list their TRS-80 related publications. Each sourcebook includes forms to submit listings for the next issue (deadline for submissions for the second edition is May 1, 1983).

The first edition is now available through your local bookstores or computer stores or direct from us.

## (Dealer's inquiries invited)

(*) TRS-80 is a registered trademark of the Tandy Corporation

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Send to: Ocean, Inc.
P.O. Box 2331
Springfield, Virginia 22152-0331

For information or credit card orders call (703) 323-1928

Please send me _____ copies of the *TRS-80* Programmer's Sourcebook.

☐ I have enclosed a check or money order for $4.95 per copy (plus $1.00 per copy for postage and handling) (VA residents add 20¢ per copy sales tax)

☐ Please charge to my (VISA) (MasterCard) (circle one) account
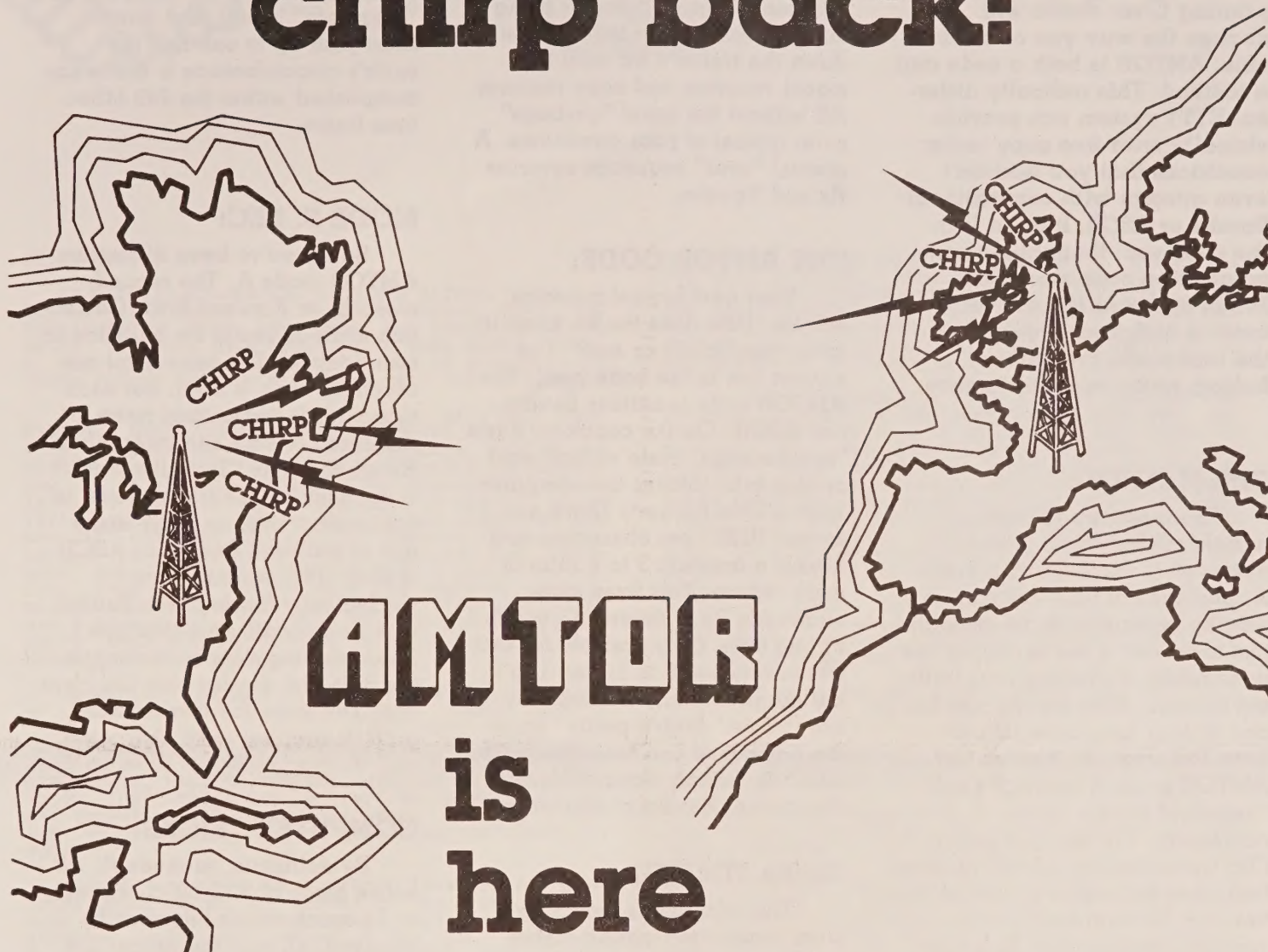
Card # _____ Exp. Date _____

Signature _____ Interbank # _____

Name _____

Address _____

City _____ State _____ Zip _____

# AMTOR, WHAT IS IT?

AMTOR, AMateur Tele-printing Over Radio will change the way you communicate. AMTOR is both a code and a method. This radically different RTTY system can provide virtually error-free copy under conditions that you wouldn't even attempt with conventional Baudot or ASCII. It is, in fact, the most well thought-out communication code since Sam Morse pounded brass. Every facet is designed to overcome the real-world problems of fading, noise and interference.

## THE METHOD:

There are two variations, namely modes A & B (clever names eh?). In describing mode A, imagine the time wasted with lengthy repeats of whole messages just to correct a few errors, or the uncertainty of whether your traffic got through. How many times has one of your long dissertations been lost when the band folds? AMTOR mode A shortens each "message" to only three characters. The sending station (Tx) transmits this "block" of three then goes to receive so that reception can be confirmed by the receiving station (Rx). This is accomplished by the Rx transmitting a short "control signal" back to the Tx. Upon confirmation, Tx sends the next three character block. If not confirmed, the same block is repeated again, and again until it's perfect, or the computer decides it's not possible. As you can guess, this eliminates the necessity to type out repeats such as name, call etc. Signal reports are also redundant because you can tell by the number of repeats requested how well you're being copied! Even deep fades just slow down the traffic a bit until the signal recovers and copy resumes. All without the usual "garbage" print typical of poor conditions. A special "over" sequence reverses Rx and Tx roles.

## THE AMTOR CODE:

Your next logical question will be "How does the Rx know it got a good block or not?" The answer lies in the code itself. The AMTOR code is neither Baudot nor ASCII. On the contrary, it is a "synchronous" code without start or stop bits. (Makes the computer work a little harder!) There are seven "BITS" per character, and always a constant 3 to 4 ratio of mark / space. This fixed ratio allows the Rx to determine good or bad data. (It *is* possible for *two* bits to reverse, 0 to 1, and 1 to 0, but the probability is extremely low !) This "double parity" limits the number of combinations to 35, which is directly compatible with the current Baudot character set.

## Tx/Rx TIMING:

The continuous switching from receive to transmit makes some critical demands on the radio, because each three character block is sent in 210 MSec., (21 bits at 100 baud). The confirming control signal falls in the next 240 MSec., usually after a 10 to 20 MSec. delay for a total time of 450 MSec. (This explains the familiar "chirp-chirp" signal of about 2 per second that you hear.) The radio must fully recover from transmit to receive in less than 10 MSec. Generally, QSK rigs and most of the current crop of radios can handle it. Some might require an AGC tweak etc. A simple method is to use a separate receiver. That's the way a lot of commercial ships do it. Information on individual rigs will be made available as we go.

## MICROLOG
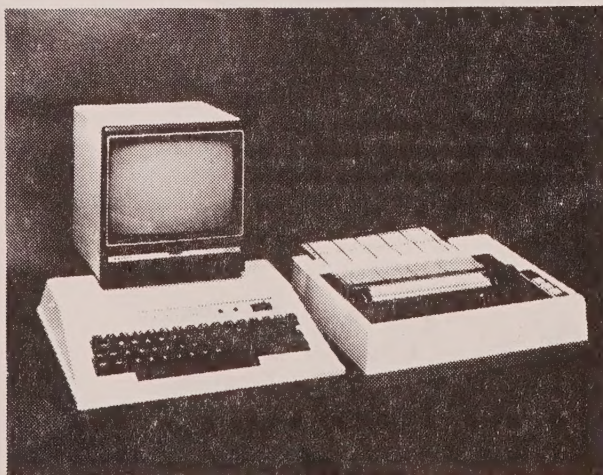### INNOVATORS IN DIGITAL COMMUNICATION

## PROPAGATION TIMING:

The timing requirement also limits the total distance that can be traversed due to propagation delays out and back. Simply put, "long-path" is out! But direct short path up to one-half the earth's circumference is easily accomplished within the 240 MSec. time frame.
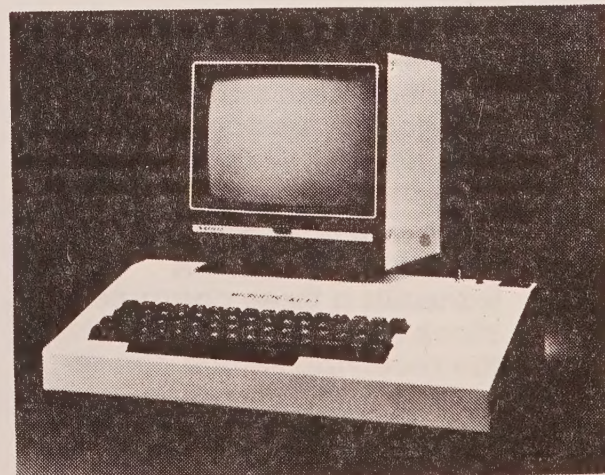
## MODE B, FEC:

So far we've been discussing AMTOR mode A. The second, mode B, or Forward Error Correction mode is useful for bulletins or round tables. The same 7 bit synchronous code is used, but each character is transmitted twice, separated in time and inter-mixed. Hence the term "Time Diversity " is applicable. The transmission is continuous, with no hand-shake just as standard Baudot or ASCII is sent. (FEC sounds more rhythmically flowing than Baudot with its periodic start/stop bits.) The receiving stations recompile the data and display only the clear text. The same 3:4 mark/space ratio determines valid characters.

## COMPUTER TRICKS:

By definition, in mode A, an entire block of 3, 7-bit characters, or 21 synchronous bits must be received, all with the proper 3:4 ratio to be considered valid. In our system, if *any* characters are valid, we save them and ask for a repeat. Chances are, the missing characters will be recovered in the next block. By accumulating characters, the "thruput" (computer jargon!) is significantly increased under poor operating conditions. Also, if signals do drop out entirely, we repeat for 32 tries before we discontinue.

# PROTOCOL

David W. Borden, K8MMO
Rte 2, Box 233B
Sterling, VA 22170
703-450-5284

## AX.25 Lives!

In a truly monumental software effort, two Los Angeles-area amateurs, David Henderson, KD4NL and Harold Price, NK6K, have coded the AMRAD-sponsored AX.25 prococol into PASCAL code that works well. A short history of this protocol is probably in order before some details sink into obscurity.

In the middle of the Summer of '82, Paul Rinaldo, W4RI urged Terry Fox, WB4JFI, Eric Scace, K3NA, Jon Bloom, KE3Z, Gordon Beattie, WB2CAM and myself to study X.25 with an eye toward implementing it in Amateur Radio packet networking. Eric led the group in explaining what it was all about (Eric has quite a bit to do with the standard) and how it could be applied to Amateur Radio. He showed us which pieces were required and which were not. When we would say that a piece did not fit, Eric would explain what the protocol people meant when they wrote that piece. The end result was a protocol, we named AX.25 (for Amateur X.25). Terry and Gordon proceeded to write Level 2 and Level 3 protocol specifications.

Meanwhile, unknown to us, the Los Angeles group of two was running X.25, ASYNC. Dave used a PASCAL version running on a SWTP 6809 system and Harold used a Z80 assembly-language version running on an S-100 mainframe. At the urging of Wally Lindstruth, WA6JPR, the two switched to HDLC using $5.00 8273 chips (oh where, oh where did they get these?). So there they were, running X.25, and we East Coasters were quibbling over bits to set.

Harold and Dave had a rather interesting protocol going ASYNC. The format of the frame was the same as the usual HDLC frame, but they used an additive checksum instead of the LRC checksum. Special characters preceded the FCS and header fields and they used a one-byte address field.

To continue the protocol story, Tom Clark, W3IWI of AMSAT fame, figured out that this protocol bickering had to cease. So, last fall he locked us all in a room, including the TAPR gang from Arizona and demanded that we come out with a protocol standard, which we did. Level 2 of AX.25 was blessed. Thanks to the AMSAT and TAPR gangs we got this document out of the closet. The name also started appearing as the "AMSAT-TAPR" protocol in written works and AX.25 in spoken works. The reason for this is obscure, but has something to do with higher levels of protocol I think. If you call it AX.25, that assumes the Level 3 (Network) level protocol you write is X.25 like. If you call it something else, your Level 3 can look like whatever you want. It is all moot now since Harold and Dave will no doubt code up Level 3 in two shakes of a flag byte.

In late September, Harold Price called Den Connors of TAPR on the phone to ask what was up. Den sent him a copy of AX.25 and the rest is history. You can read the whole story in the December TAPR newsletter, written by Harold. Harold and Dave teamed up with the supurb 6809 coder from TAPR, Margaret Morrison, KV7D. The end result is the first TAPR TNC boards are being shipped as I write. The PASCAL code works well, both in AX.25 mode and Vancouver mode. I had the pleasure of playing with the board and software this week and it has excellent debugging features on-board. These three software types deserve a well done for completing this effort in record time with super code. Contact TAPR as follows for further information:

Tucson Amateur Packet Radio Corp.
P.O. Box 22888
Tucson, Arizona 85734

Enclose $12 for dues for one year and get their newsletter to keep up to date.

Even better news is shaping up. All you folks out there that bought Vancouver boards are not lost. Besides TAPR talking to you by software switch, someone in New Jersey has coded part of AX.25 into the Vancouver board in 8085 code. This is reported by Gordon Beattie, and AMRAD will track down this programmer and beg him to give out some data about his efforts for the next newsletter. Another rumor has Hank Magnuski, KA6M in San Francisco also coding AX.25 up in assembly language, but for his home computer. A phone call to Hank should get a report on this activity for the next newsletter. Harold and Dave are probably coding up Level 3 Network software by now, fast little coders that they are.

AMRAD is now working on various projects, but we do not want to advertise. We may fail and we are slow experimenters. We will have to work very hard to contribute as much to packet radio as the Los Angeles crew has done. More next month as 180 TAPR boards hit the streets.

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## New Northern California Packet Repeater

The CSU Chico packet repeater is now on the air on 146.58 MHz with the call sign WD6BPR/RPT. It operates from the CSU Chico campus with a home-brew J-pole antenna about 35 ft above ground.

We are using Bell 202 type modems out of the financial terminals Electrovalue Industrial in NJ was selling. These modems are CCITT V.23 modems instead of Bell 202. However to convert them requires only changing two resistor values. For $55.00, we could not complain. We are using the modems and power supply from these terminals, and have not even touched the rest of the goodies.

We currently have two nodes and the repeater working, and a third node is under construction. We are using the VADCG TNC boards and various 2-meter rigs ranging from a Kenwood 2400 to a Yaesu FT-221 with equal success. A remote bulletin-board system (RBBS) system will be online as soon as the software decides to work.

Any questions may be addressed to Jim Haagen Smit, WD6BPR, 916-893-0385 or Mike Spann, WB6KIN, 916-345-1966 or on 146.49 MHz simplex. - Thanks, KA6M.
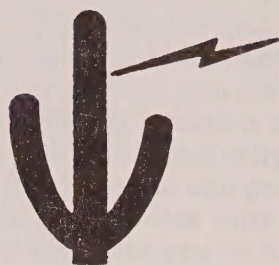
# Tucson Amateur Packet Radio Activities

Lyle Johnson, WA7GXD and Dan Morrison, KV7B
P.O. Box 22888
Tucson, AZ 85734

## Black Thursday

All was going well. The parts were in hand, pc boards delivered and volunteer (slave) labor lined up for the BIG PUSH -- would you believe Beta TNCs in time for Christmas?

Neither would Murphy! On Wednesday, 8 December 1982, the first TNCs were delivered to TAPR from one of the two assembly plants. The first one worked perfectly! Unfortunately, by 2:00 A.M., Thursday, 9 December, a serious problem was very apparent. "Black Thursday" was upon us. Only 3 of the first 19 TNCs were functional.

After a fitful (morning's) rest, an emergency meeting of the TAPR executives was called, production halted, and an investigation into Murphy's doings launched.

It turned out that there was a problem in the plate-through job on the pc boards, meaning that the top half and the bottom half of the board were intermittently (dis)connected. The 119 TNCs assembled by the time of the halt in production were sent to the scrap bin, and an assessment of the damages made. The losses were a staggering $8600!

TAPR, being in no position to absorb such a blow, determined to finish the project anyway. A salvage operation was mounted, and in the end there is a $3000 loss to contend with — not insubstantial, but one that, with a judicious amount of finagling, and some voluntary $upport from those interested in seeing this thing through, can be overcome. New boards were ordered fabricated (free) and parts to populate the boards reordered.

After a few slips in the schedule, 10 boards were received the week of 28 December 1982. Two were hand-assembled by WA7GXD, and worked the first time. Three were assembled by one of the two assembly plants, wave-soldered and delivered. All three worked!

The delay time was used by both the software group, for additional debugging and refinement, and the hardware group, for additional testing and interfacing. Meanwhile, the approximately 70-page TNC Manual is being edited and clarified.

The present schedule calls for board assembly to begin the week of 9 January with assemblies delivered to TAPR late in the week of 16 January. The boards will then be powered up, and power-supply voltages checked. Passing this test, the ICs will be loaded and calibration performed on the MODEM. Finally, the TNC will "connect" to itself via a digipeater, then be packed up, along with the manual, for shipment to the Beta coordinator. The Beta coordinator will then be responsible for distribution of the TNCs to the individual site participants.

It has often been asked if the TAPR TNCs will be compatible with the Vancouver TNCs, and the answer is an emphatic YES! Harold Price, NK6K and co-author of the high-level PASCAL software, established a connection with Skip Hanson, WB6YMH, in Los Angeles on 8 January 1983. Harold was using a Beta TNC, while Skip used a VADCG TNC. Packets were exchanged for a half-hour or so,

and the test was a complete success!

The initial software released with the Beta boards is a version of the AX.25 level 2 protocol agreed upon at the AMSAT meeting in Washington, DC the weekend of October 8th, in addition to the more-or-less standard Vancouver protocol in general use. The software is outlined below.

## Software Update

This update would be written by Margaret, KV7D, rather than by me (KV7B), except that as these words are being composed she is putting the last bells and whistles in the TAPR/AMSAT AX.25 level 2 protocol software which will appear on the TAPR Beta board at time of distribution. The people responsible for this monumental effort are: Dave Henderson, KD4NL, who was responsible for implementing the protocol; Margaret Morrison, KV7D, who put together the entire package of real-time assembly language routines and debugger; and Harold Price, NK6K, who built the extremely flexible command parsing language. Of the 24k bytes of PROM on board, 22k are used in this release. The high-level routines were written in compiled Pascal, and occupy about 16k of the total. The entire development time was roughly from the AX.25 protocol meeting in October until today (mid-January).

The simplest description of the software is that it's everything any of us dared to hope for and more. Not only does it implement AX.25 level 2 protocol "by the book," (it follows the October 10 document produced at the AMSAT meeting, based on the AMRAD recommendations; and where ambiguities exist, follows Ma Bell's BX.25, issue 2 document), but it can also operate in Vancouver compatability mode with no problems.

Present at this time are some 66 user-settable parameters for controlling the behavior of the board, many of them for determining the details of terminal communication. In this short space only a few highlights may be mentioned, but they include such items as hardware and software flow control, separately controllable in either direction, with the software flow control characters being user definable. In order to permit total transparency a single command defeats all special character traps and packetizes according to timer and packet-length criteria. At the other extreme, input editing at the character and line level are available, including a separate "cancel packet" command.

Perhaps the most important features are the elaborate timer-operated CSMA procedures, including (all user-settable) separate key-up delays for digipeating and originating packets, separate delays for voice repeater key-up and tail-drop times, and random wait times after collisions. Flow control on the rf link also involves time delays. Altogether, there are ten distinct timer functions associated with the RF link, requiring 4 separate clocks to be maintained by the interrupt-driven routines.

All in all, the functions presently on board should be more than adequate for the "shakedown cruise" coming up during Beta Test, and future releases will have even more features (we've still got 2k PROM to go before adding the next deck to the board!).

# Inside the "Packet Radio Treasure Trove"

Terry Fox, WB4JFI
1819 Anderson Road
Falls Church, VA 22043

AMRAD has been running an advertisement the last couple of months for a surplus financial terminal being sold by Electrovalue Industrial Inc. in Morris Plains, NJ. This device caught my eye, mostly because it contains a Bell 202 modem on a relatively small board (approx. 5 by 5.5 in.). Upon inspecting an actual unit, I found a lot more that could potentially be useful to the average experimenter. This unit is enclosed in a nicely made molded-plastic box that measures about 11 by 14 in. by about 5.5 in. high. Its small size hides a lot of stuff packed very tightly inside. In addition to the calculator-style keypad and miscellaneous other buttons on the top, there is also a magnetic card reader (used to read the data off credit cards) and sixteen digit display. The box looks so nice it's almost a shame to tear the unit apart. I haven't figured out what to use the credit-card reader for yet, but given time I am sure someone will come up with something. On the back of the box is a couple of switches and a nine-pin connector that is used for the connection to the phone line.

After removing the two screws from the back of the unit that hold on the top part of the box and carefully lifting the top off, one can see that the goodies are really packed in. In all, there are six boards and an enclosed power supply inside. Three of the boards are mounted in the top of the unit (mag-card reader, keyboard, and flourescent display and driver boards). The bottom contains the power supply and one large board, which is a single-board micro. The other two boards (the modem and the mag-card reader interface) mount to the computer board piggy-back style.

## Boards in the Top

Unless having a sixteen digit display for your computer turns you on, I don't see any common use for the boards mentioned above that are in the top of the unit.

## Power Supply

The Power Supply is completely self contained down to its power cord and switch. It delivers +5V at 2.5A, +12V at about 0.5A, -5V at 0.25A, 7Vac, and -35V for the display. The display voltages are on a different connector from the others, so they could easily be ignored.

## Computer

The computer board (7.5 by 10 in.) has a lot of interesting stuff on it. It uses an 8080 CPU, so it is relatively old technology, but it does work. It uses the 8224 clock generator (at 18 MHz) and the 8228 bus-interface chips to support the 8080. There are sockets for up to four EPROMs, and they can be either 2708 or 2716 types. One major drawback to the computer board is that it uses 2112 RAM chips which are only 256 bytes wide, so there is very little RAM available. It also has an 8251 USART for serial communications and an 8253 timer chip. All of the chips mentioned so far are socketed, so they could be removed for other projects with no harmful effects. There are also a lot of other chips on the computer board, such as line drivers, latches, and misc. logic ICs, but they are all soldered in, so removal could be a problem. The unit I have did seem to come up and work (as much as I could figure out), so if someone needs a single-board computer of limited capability, this one should do it, and it beats building one!

## Card Reader Interface Board

This board contains nineteen chips, all soldered down, and really isn't of much use.

## Modem

The modem card is probably the best reason to buy one of these units. It is a 202-type modem (see "New Northern California Packet Repeater, p.3, for their modem modifications), with a four-wire interface (separate transformers for audio in and out) which runs on plus and minus five volts. The interface signals are TTL levels (which might be a problem). The modulator uses Tx data and RTS as inputs, and has CTS for an output. The receiver has Rx data and carrier detect for outputs. The design is the normal bandpass-filter approach, NOT phase-locked loops, which is a plus in my book.

In conclusion, I should say that this box isn't for everyone, and some parts of it are definitly not in the useful category, but I have spent more than the total price ($55.00) for just a 202 modem, so this is probably a good buy. By the way, for an additional five dollars you can get the schematics, which can come in quite handy.

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## Commerce Business Daily On Line

The U.S. Department of Commerce publishes a daily list of U.S. government procurements, contract awards, surplus property and non-U.S. government tenders. It is now available on line on the same day as published via DIALOG. If interested, contact Betty Davis, 415-858-3785.

## USUS San Diego Meeting April 22-24

The UCSD Pascal User's Society will hold its semi-annual national meeting at the Hanalei Hotel in San Diego April 22-24. Featured will be technical presentations, hardware and software demonstrations, language tutorials, special-interest group meetings and software library exchange. Tutorials will include the p-System, UCSD Pascal, Modula-2 and advanced UCSD Pascal topics. Preregistration is $25 before April 8. Mail checks payable to USUS and mail to USUS Meeting Committee, P.O. Box 1148, La Jolla, CA 92038. Registration at the door will be $35 beginning at 10 A.M. on Friday, April 22. Annual society membership is $20. Members will be able to copy the library onto their disks for $1.00 each.

## Used Equipment Good/Excellent Condition

Desire to sell, price negotiable. You like, we talk!

Collins: KWM-1 w/ac & dc power supplies; mobile mount and antennas. 75A-3 w/3 & 1kHz filters, 160-10 m.

Heahkit: SB-401 Tx 175W 80-10m some tubes. SB-104A xcvr 150W 80-10m mod & checked by HK w/ac PS & external VFO.

Measurements: Mod 80 signal generator 4-400 MHz, 0-300 mV out.

Gen Radio: Impedance bridge (rf) Mod 916A 50 kHz-50 MHz.

Books for all of the above. Some spare tubes. - John R. True, N4BA, 10322 Georgetown Pike, Great Falls, VA, 703-759-2073.

## Sale

Collins TX-ART-13 metered pwr supplies, spare parts, manuals. - W3RGX 301-530-1528.

# AMSAT and VITA Jointly to Pursue PACSAT

Tom Clark, W3IWI
6388 Guilford Road
Clarksville, MD 21029

The Radio Amateur Satellite Corp. (AMSAT) and the Volunteers In Technical Assistance (VITA) (note — pronounce as VI-TAH as in the word "vital") have announced their intent to pursue a joint effort to develop a low-cost packet radio satellite system called PACSAT.

VITA, headquartered in Rosslyn, VA, is a private, nonprofit organization that supports people working on technical problems in developing countries with technical information provided by thousands of volunteer scientists, engineers and technologists. The information and assistance that VITA provides are aimed at helping local people in developing countries to select and implement technologies appropriate to their local situations.

VITA Director Henry Norman and VITA Project Coordinator Dr. Gary Garriott, WA9FMQ announced that VITA has just awarded AMSAT a $15,000 Design Definition Grant to support development of PACSAT as a reliable low-cost digital satellite system to meet requirements for communications of technical information on renewable energy resources to and from their many field locations. AMSAT's role in this joint activity will be to provide hardware suitable for demonstration programs and to provide technical assistance in developing a low-cost system. Part of this effort will involve adapting solar power, amateur radio and personal computer technology for use in the field, far removed from any technical support.

AMSAT's PACSAT project manager, Den Connors, KD2S indicated that this grant will support initial PACSAT design definition activities which are being coordinated by AMSAT with work being done in some 15 locations around the world.

It is also of interest to note that WA9FMQ is a cousin of NASA astronaut Dr. Owen Garriott, W5LFL who may be amateur radio's first "space mobile" by operating from the Space Shuttle if a AMSAT and ARRL proposal is approved by NASA.

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## CORRESPONDENCE

### Letter from Sweden

You are sure making progress on standardization. It was with great interest I read first the AMSAT Satellite Report and then the copy of QEX you sent me. The HDLC/AX.25 as proposed there has seemed to gain quite some foothold in the U.S. It will most certainly be incorporated as one of the basic formats in SOFTNEW for radio links.

We've also been making some progress, however not on the UHF transceiver. Another redesign! A group in Stockholm has now taken responsibility to make a design of their own. The specs still hold however:

100-kbit/s bit rate
MFM clock coding
FSK/MSK modulation
434-MHz center frequency

The software and computer group has made some more progress. A software specification including a user manual/implementers' guide is almost finished. We are currently testing the network concept using a twisted-pair cable as transmission medium. This has proven to be an excellent "channel simulator" to test our algorithms (cf ULC net presented in BYTE magazine last year). Five nodes using the SOFTNET protocol are in operation with speeds up to 9600 bauds. the 100-kbit/s data rate is at the moment not possible since we have only one prototype of the high-speed hardware. The main (node) CPU of our system is available in kit form including the basic M-FORTH multi-tasking software in two 2732 PROMs. The pc layout of the LINK computer will be made during January. — Jens Zander, SM5HEV, Linkoping University, S-581 83 Linkoping, Sweden.

### Police Radar Tests

Occasionally hams request (ARRL) Headquarters to assist them in their claims that their amateur mobile transmissions have caused police radars to malfunction. I usually send them a letter which states that we believe that it is possible for amateur transmissions to cause police radar devices to give an incorrect reading. I also send a copy of AMRAD's "Tests of Susceptibility of Police Radars to Amateur RFI."

Has AMRAD updated this paper, or does it have plans to conduct more tests? This paper has helped dozens of radio amateurs throughout the country, but I would like to use newer data if it is available. Also, in the most recent use of this paper a ham asked whether we had considered investigating the possible effect on radio of so-called "PL" subaudible tones. The ham involved always uses a 107.2-Hz PL tone, and he wondered if a radar would show a particular "speed" for that tone and perhaps a different "speed" for another.

Any additional information you have would be greatly appreciated. — W. Dale Clift, WA3NLO, Deputy Manager, Membership Services Department, ARRL, Newington, CT 06111.

Ed. Note: In 1975, AMRAD conducted tests of susceptibility of 10.525-GHz police radars to Amateur Radio mobile transmissions in cooperation with two Northern Virginia police departments. The report can be summarized by saying that the radars usually did not give erroneous readings except when the transmitter was quite close to the radar. We are looking for volunteers to conduct another series of tests leading to a new report which may be of value to the amateur community. Please contact Paul Rinaldo, W4RI, 703-734-0878.

### Meteor-Burst Communications

There is an article in the December 29, 1982 issue of Electronics that you must read. The article is "Meteor-Burst Communications Bounce Signal between Remote Sites," by Willis E. Day, pages 71-75. This article has direct application to packet radio.

After reading this article I now have the following questions. Could the TAPR board software be modified to use meteor burst? Are modifications required? What advantages does meteor burst have over hf? What are its disadvantages? Do standard protocols allow meteor burst?

From reading the article meteor burst sounds like something that hams can do. I think that packeteers should not be unaware of it. — Jim Osburn, WD9EYB, 2303 Hulman St, Terre Haute, IN 47803.
Ed. Note: Anyone for meteor-burst packets?
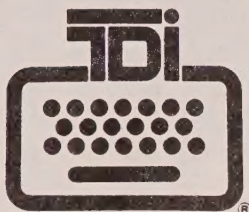
# THE DEAF AND THE TTY

Barry Strassler, KA3KDF
Executive Director
Telecommunications for the Deaf, Inc.
814 Thayer Avenue
Silver Spring, MD 20910
301-589-3006 (Voice/TTY)

### Open Letter to Deaf Radio Hams

An item under "Strays" in the December 1982 QST, page 58, issued a general call for deaf hams (and aspiring deaf hams) to get in touch with me. It pleased me to know that some letters reached me in response to this appeal. Five hams told me that they are hearing impaired to some extent. This makes a total of eight deaf hams, including myself, Nan Sanders and one Californian. Plus, one software company man wrote, knowing of a deafened, but inactive ham. A college in Ohio wrote expressing interest in what we may have to offer the deaf hams.

The Courage Center, of the Courage HANDI-HAM System wrote saying that they know of two deaf and blind hams, one of them orthopedically handicapped. So this makes a total of ten known deaf hams. Since there are more than a half million licenced hams in North America, I am sure that half of them missed the QST item, not being ARRL members. Perhaps there are as many as two or three dozen deaf, deafened and hearing-impaired hams that we do not know of.

Ten years ago I was involved with the American deaf ice hockey program. I was charged with the responsibility of recruiting deaf hockey players, if there were any, for our national deaf hockey team. I thought that task was hopeless, as I knew offhand of only five or six deaf players. But I kept on plugging, and to my amazement, I came up with 40 deaf hockey players. A deaf friend of mine is an amateur magician. Curious, he beat the bushes and uncovered 12 deaf magicians! Another deaf acquaintance is a licensed pilot and he, too, uncovered about 70 deaf pilots. Using this "you-don't-know-unless-you-try" rationale, I am sure that there are more deaf hams in the bushes.

The question is — should we try to set up a formal organization serving the needs of the identified deaf hams? And in what format? With AMRAD and the TDI or the ARRL or a combination of these three? And what should the organizational objectives and philosophy be? Should we exist to help train deaf people to become hams? Should we set up an hf-RTTY net? Should we train deaf people how to solve technical problems such as tactile devices and corrective audio devices? Should we openly encourage active hams beset with impending hearing losses to continue this hobby? Should non-deaf, but sympathetic and sensitive, hams be encourages to join? There are hams whose family members and/or personal acquaintances are deaf. Should we petition the FCC to relax the Morse-code requirements for the deaf, an issue that promises to create a controversy?

I need to hear from all of you. I cannot do the job alone, nor turn the ideas into policies myself. What are your views/feelings? And please include a line on how you were able to pass the Morse-code exams. Please write to me at the above address.

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# AMRAD  Amateur Radio Research and Development Corporation

## Membership Application/Renewal

The Amateur Radio Research and Development Corporation (AMRAD) is a worldwide club of over 500 amateur radio and computer experimenters. It is incorporated in Virginia and is recognized by the U.S. Internal Revenue Service as a tax-exempt scientific and educational organization.

The purposes of AMRAD are to: develop skills and knowledge in radio and electronic technology; advocate design of experimental equipment and techniques; promote basic and applied research; organize technical forums and symposiums; collect and disseminate technical information; and, provide experimental repeaters.

Meetings are on the 1st Monday of each month at 7:30 P.M. at the Patrick Henry Branch Library, 101 Maple Ave E, Vienna, VA. If the first month is a holiday, an alternate date will be announced in the newsletter. Except for the annual meeting in December, meetings are normally reserved for technical talks - not business.

WD4IWG/R is an open repeater for fm voice and digital communications, especially for experimental modes. It is located at Tyson's Corner, McLean, VA. It features semi-private autopatch available to licensed members. Frequencies are: 147.81 MHz in, 147.21 MHz out. The repeater director is Jeff Brennan, WB4WLW.

WB4JFI/R is a 1200-baud half-duplex packet repeater in Falls Church, VA and may be accessed via WD4IWG/R frequencies.

WB5MMB/R is a 1200-baud simplex packet radio repeater which operates on 147.585 MHz from Vienna, VA.

The AMRAD CBBS, 703-734-1387, is operated by Terry Fox, WB4JFI. The system accepts 110, 300, 450 and 600-baud ASCII, Bell 103.

Handicapped Education Exchange, 301-593-7033, is operated by Dick Barth, W3HWN. HEX accepts 110/300-baud ASCII and Baudot deaf TTY/TDD calls.

AMRAD is affiliated with the American Radio Relay League (ARRL), Foundation for Amateur Radio (FAR), Northern Virginia Radio Council (NOVARC) and the Mid Atlantic Repeater Council (T-MARC).

The AMRAD Newsletter is mailed monthly to members and other clubs on an exchange basis. Technical articles, product announcements, news items, and other copy relating to amateur radio and computing are welcome. Honorariums at a rate of $15 per printed page ($20 maximum per author per issue) are paid for original material accepted. Classified ads are free to members. Commercial ad inquiries are invited. The editor reserves the right to reject or edit any portions of the copy. Items should be mailed by the 8th of the preceeding month to Paul Rinaldo, W4RI, 1524 Springvale Ave, McLean, VA 22101. Full permission for reprinting or quoting items is granted provided that credit is given to both the author and the newsletter. Mailing to U.S. and possessions is by 3rd Class bulk mail. Canadian and Mexican addresses add US$2 for postage. Overseas readers add US$8 for air mail or US$2.30 for surface.

AMRAD officers for 1982 are:

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Our CompuServe/Micronet number is [72345,1050], and our Source identity is TCA182.